

WHAT IS CLAIMED IS:

1. A tire pressure monitoring device for monitoring tire pressure, said monitoring device comprising:
  - 5 a housing coupled to a tire valve;  
said housing having a first pressure chamber, a second pressure chamber, and a flexible membrane, wherein said first and second pressure chambers are separated by a flexible membrane; and  
a signaling means located within said housing, wherein said signaling means emits a warning signal when a pressure within the first pressure chamber is greater than a pressure within the second pressure chamber.
- 10 2. The tire pressure monitoring device of claim 1 wherein said housing further comprises:
  - 15 a lens, a main housing, and a lower housing, wherein said lens is coupled to a first end of said main housing and said lower housing is coupled to a second end of said housing.
- 20 3. The tire pressure monitoring device of claim 2 further comprising a screw cap that couples said lens to said main housing.
4. The tire pressure monitoring device of claim 3 further including a conductive gasket provided between said lens and said main body.
- 25 5. The tire pressure monitoring device of claim 1 wherein said housing further includes at least one battery.

6. The tire pressure monitoring device of claim 1 wherein said flexible membrane is a conductive substance.
7. The tire pressure monitoring device of claim 6 wherein said conductive substance is a conductive metal or conductive rubber.
8. The tire pressure monitoring device of claim 1 wherein said signaling means is coupled to a printed circuit board.
9. The tire pressure monitoring device of claim 1 wherein said signaling means is selected from the group consisting of a light emitting diode (LED), a speaker, a radio frequency (RF) transmitter, and an infrared (IR) transmitter.
10. A tire pressure monitoring device for monitoring tire pressure, said tire pressure monitoring device comprising:  
a lens, a main housing body, and a lower housing body, wherein  
said lens is coupled to a first end of said main housing, and said lower housing is coupled to said lower housing body;  
said lens at least partially defining a counter-pressure chamber;  
said main housing body defining a main pressure chamber having a power supply, a signaling means, and a flexible membrane;  
said flexible membrane separating said counter-pressure chamber and said main pressure chamber; and  
said lower housing body adapted to engage a tire valve.
11. The tire pressure monitoring device of claim 10 further comprising a screw cap that couples said lens to said main housing.

12. The tire pressure monitoring device of claim 10 further including a conductive Seal provided between said lens and said main body.
13. The tire pressure monitoring device of claim 10 wherein said power supply is at least  
5 one battery.
14. The tire pressure monitoring device of claim 10 wherein said signaling means is selected from the group consisting of a light emitting diode (LED), a speaker, a radio, frequency (RF) transmitter, and a infrared (IR) transmitter.  
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15. The tire pressure monitoring device of claim 10 wherein said flexible membrane is a conductive substance.
16. The tire pressure monitoring device of claim 15 wherein said conductive substance is  
15 a conductive metal or a conductive rubber.
17. A tire pressure monitoring device for monitoring tire pressure, said tire pressure.  
monitoring device comprising:  
a housing, wherein said housing is adapted to engage a tire valve; and  
20 said housing including a means for sensing a pressure differential and a means for signaling said pressure differential.
18. A method of monitoring air pressure within a tire, said method comprising:  
providing a tire pressure monitoring device of claim 1;  
25 attaching said tire pressure monitoring device to a tire valve;  
calibrating said tire pressure monitoring device;  
monitoring a pressure differential between said tire pressure monitoring device and an air pressure of said tire; and

emitting a warning signal when said pressure differential exceeds a predetermined pressure differential.

- 5 19. The method of claim 18 wherein said calibrating step further includes allowing air from said tire to enter a counter-pressure chamber of said tire pressure monitoring device and sealing said counter-pressure chamber.
- 10 20. The method of claim 19 wherein said pressure differential is a difference between the pressure of said counter-pressure chamber and said air pressure of said tire.
21. The method of claim 20 wherein said warning signal may be a signal selected from the group consisting of a light, a sound, a radio frequency (RF) wave, and an infrared (IR) light.
- 15 22. The method of claim 18 further comprising:  
removing said tire pressure monitoring device to periodically to ensure that said device is properly working.
- 20 23. The method of claim 18 further comprising:  
removing said tire pressure monitoring device from said tire valve; adding air pressure to said tire; and reattaching said tire pressure monitoring device to said tire valve.
- 25 24. A valve cap having an interior air pressure supplied through a conventional tire valve, said valve cap comprising:  
a transparent top;  
a light emitting diode (LED) attached to a printed circuit board;

an upper housing which accommodates the LED and the printed circuit board;

a flexible membrane;

5 a counter-pressure chamber, wherein the counter-pressure chamber is a space between the transparent top and the membrane;

at least one battery located within the upper housing; and

a lower housing which is internally threaded and adapted to mate with a tire valve assembly.

10 25. A valve cap as defined in claim 24, wherein the circuit board further comprises flashing circuitry.